

## THE VEGETATION OF THE THOMAS BAINES NATURE RESERVE

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### ABSTRACT

The vegetation of the Thomas Baines Nature Reserve, a small reserve near Grahams-town, is described. Three main types of vegetation are recognised: Macchia-Grassveld; Savannah; Forest and Thicket. Quantitative data on ground cover, stem heights and diameters and crown diameters of plants over one metre are tabulated. A list of species recorded is appended.

### INTRODUCTION

**Situation:** The Thomas Baines Nature Reserve is in the Albany District, Cape Province, about 12·9 km (8 miles) south-west of Grahamstown on the Port Elizabeth road. (33° 23' S, 26° 28' E).

**Ownership:** The reserve belongs to the Grahamstown Municipality.

**History:** The reserve was bought by the Grahamstown Municipality in 1928 as part of the area round the Howison's Poort Reservoir which was opened in 1931. Since then it has rarely been used for grazing except for a small number of animals in times of drought. In 1961 it was proclaimed a nature reserve, but it was not until 1964 that the first animals were introduced.

**Topography:** The 257 hectare (300 morgen) reserve is situated in the valley of the perennial Palmiet River and on the upper reaches of the Howison's Poort Reservoir. The distribution of land is such that about three-quarters forms a slope with an approximately south-west aspect and the remainder faces north-east. The lowest altitude is the level of the reservoir, about 335 m (1,100 ft) above sea-level, while the north-east boundary reaches about 518 m (1,700 ft). The south-western slopes reach only about 396 m (1,300 ft).

**Geology:** The underlying rock formation is principally Bokkeveld series (that is, largely shales) but along the northern boundary there is a ridge formed by Witteberg quartzite.

The soils are deep and semi-alluvial on the lower slopes but shallower elsewhere.

**Climate:** Rainfall is in the region of a mean 584 mm (23 inches) a year without very pronounced seasonal fluctuations. Resulting from the contrasting

aspects, the south-western portion tends to be warmer than elsewhere but frost may be expected generally for several months during winter.

Fauna: The most important aspect is the introduction of large mammals. These include white (square-lipped) rhino, Hartmann's zebra, several species of antelope (mainly grazing species), buffalo and warthogs.

#### ACKNOWLEDGEMENTS

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#### THE SURVEY

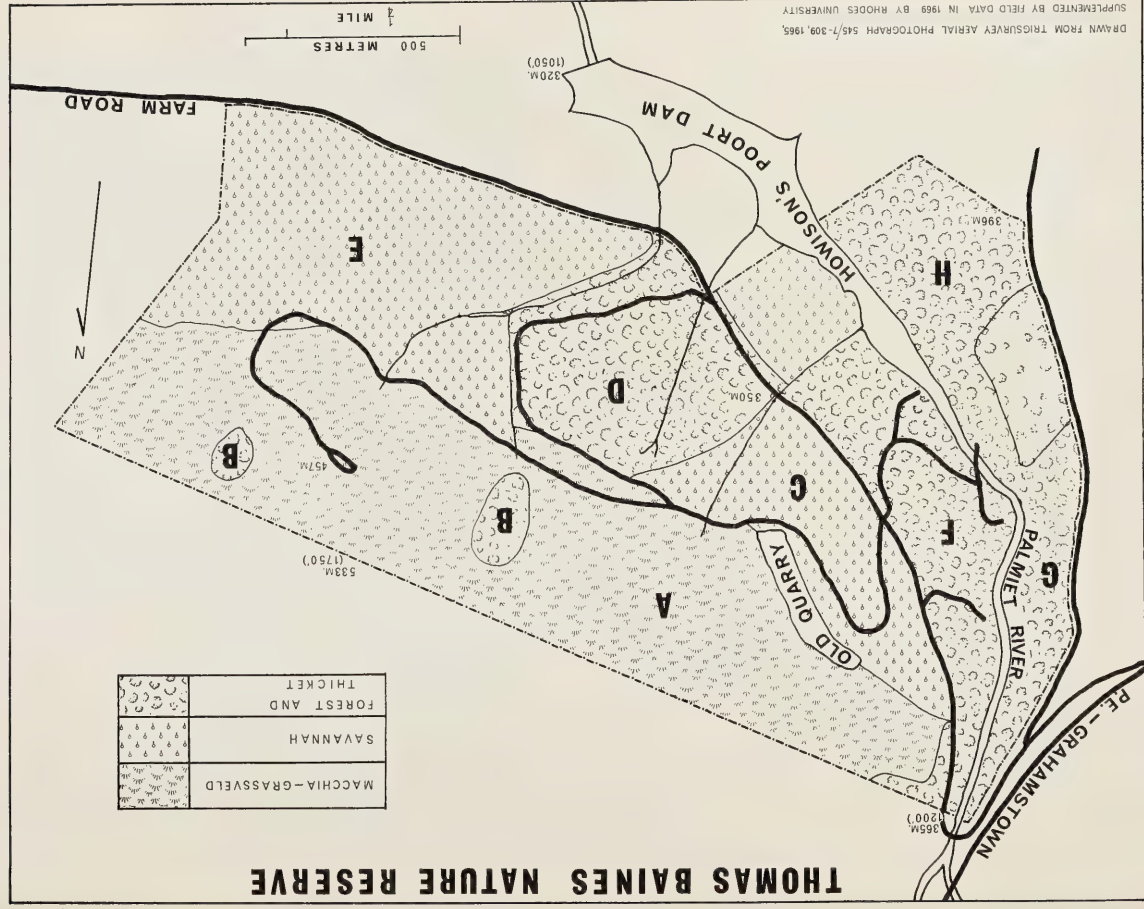
It was initially with the intention of determining vegetational changes that the survey was undertaken. It was considered that vegetational data, especially from long-term studies, would be of value in the formulation of policy of the stocking of the reserve. The work reported here was mainly carried out during April and May, 1969.

#### METHODS

With the aid of an aerial photograph (1965), the area was subjectively divided into areas A-H (see map). Within each of these areas representative sections were marked for further study. In most areas these sections include the entire areas indicated on the map, omitting only the marginal transitional portion. In area A, however, only the upper half was sampled. A number of metre-square quadrats was distributed over each area according to a pre-determined grid. In each quadrat the area covered by each species, as well as the area of exposed ground, was expressed as a percentage of the whole quadrat.

In all areas except area A, a 4×4 metre quadrat was used to compile data on the woody plants above one metre high. The 1×1 metre quadrats were situated within the larger quadrats. For each stem, distinct to, or almost to, the ground, the following data was obtained: height; diameter of the stem at one metre; mean crown diameter.

Voucher specimens of most of the species mentioned have been placed in the Rhodes University Herbarium.



In this account, tables summarising the quantitative data follow the text on each area. These show the means of: (a) percentage ground-cover and frequency of species making up one percent or more of the ground-cover; and (b) height, stem diameter and crown diameter of those woody plants over one metre high of species making up two percent or more of the stems counted. The term frequency is used to denote the percentage of quadrats in which each species was present. In referring to the percentage of ground covered it is important to take into consideration the number of quadrats in which the species occurred. High ground-cover figures based on low frequency figures must be regarded as somewhat suspect.

#### VEGETATION OF THE AREA

The reserve falls within Acocks' (1953) "False Macchia" veld type, with elements of "Eastern Province Thornveld" and "Valley Bushveld" in the vicinity. Martin and Noel (1960) place it on their map in an area of "Temperate Rainforest and Scrub", "Tussock Grassland" and "Shrub Heath and Heath—Tall Grassland".

In this paper the authors have preferred to use more general terms for the main communities but their equivalence to the terms of Acocks and of Martin and Noel is discussed.

#### VEGETATION OF THE RESERVE

No work has been published on the reserve. Although studies of the Grahamstown Nature Reserve (Martin, 1965) and of Fern Kloof (Seagrief, 1950) do include descriptions of natural vegetation not more than about 10 km (c. 6 miles) away, these communities are not very similar to those dealt with in this paper.

#### MACCHIA-GRASSVELD (AREA A)

##### (Plate 1)

This, the most continuous belt of vegetation, occupies the upper south-west facing slope and summit of the ridge forming the northern boundary of the reserve. The vegetation is generally under one metre high and forms a denser ground cover than anywhere else in the reserve, except, perhaps, for the savannah (see table 16). Though fairly uniform over most of its area, there is a tendency for the upper parts to be less dense and lower growing than the lower parts. This may be related to both greater exposure and shallower soils.

*Oldenburgia arbuscula*, which reaches three metres or more in height, is the only large woody species restricted to this area, although there are a very few small tree species, e.g. *Diospyros dichrophylla*, representing outliers of the wooded areas.





PLATE 1.

North-east corner of Thomas Baines Nature Reserve from the car park. It shows the more easterly of the two forest patches marked B on the map. The dark patches in the foreground are tufts of *Restio triticeus*, the tall stems are of *Bobartia indica*. The trees on the margin of the forest patch are mainly *Loxostylis alata* and the canopy mainly *Curtisia dentata*. The small trees to the right are *Acacia karoo*.

The most conspicuous macchia elements are perhaps the patches of *Restio triticeus* (see plate 1) and the ericoid species *Metalasia muricata* and *Selago corymbosa*. Many of the ericoid species are characteristic of rather dry or somewhat disturbed vegetation in this region, although this area is not known to have been intensively grazed for the past forty years. There are also a few species normally occurring in well-developed macchia; these include species of *Erica*, *Protea tenax* and *Leucadendron salignum*.

Grasses are abundant. These include species which are much-grazed such as *Themeda triandra* and *Harpechloa falx*. Species which appear to be less palatable include another abundant grass, *Alloteropsis semialata*.

Note on table 1:—Based on 17 quadrats, this analysis is probably fairly representative. *Streptocarpus meyeri* is restricted to the rock outcrops and probably not as important as the single record shown, suggests. *Bobartia indica*, on the other hand, is common and conspicuous because of its height. It occurred in 65% of the quadrats, making up only 0.6% of the ground cover.

The vegetation belongs to the "Shrub Heath and Heath—Tall Grassland" of Martin and Noel, but it is difficult to assign it to any of their subdivisions.

Of Acocks' types it is probably closest to "False Macchia" but shows rather strong similarities with the ground flora of the "Eastern Province Thornveld".

TABLE I  
GROUND COVER OF AREA A

|                                            | Frequency | % cover |
|--------------------------------------------|-----------|---------|
| Exposed ground . . . . .                   | 100       | 35.5    |
| <i>Selago corymbosa</i> . . . . .          | 59        | 5.4     |
| <i>Metalasia muricata</i> . . . . .        | 53        | 4.3     |
| <i>Aspalathus setacea</i> . . . . .        | 47        | 4.0     |
| <i>Themeda triandra</i> . . . . .          | 76        | 3.9     |
| <i>Alloteropsis semialata</i> . . . . .    | 41        | 3.0     |
| <i>Heteropogon contortus</i> . . . . .     | 53        | 2.9     |
| <i>Helichrysum anomalum</i> . . . . .      | 47        | 2.6     |
| <i>Restio triticeus</i> . . . . .          | 35        | 2.4     |
| <i>Alepidea capensis</i> . . . . .         | 47        | 2.3     |
| ? <i>Fimbristylis hispidula</i> . . . . .  | 59        | 2.1     |
| <i>Helichrysum felinum</i> . . . . .       | 47        | 1.7     |
| <i>Oxalis punctata</i> . . . . .           | 76        | 1.6     |
| <i>Berkheya carduoides</i> . . . . .       | 29        | 1.6     |
| <i>Senecio concolor</i> . . . . .          | 29        | 1.6     |
| <i>Helichrysum subglomeratum</i> . . . . . | 41        | 1.3     |
| <i>Tristachya hispida</i> . . . . .        | 29        | 1.3     |
| <i>Disparago ericoides</i> . . . . .       | 29        | 1.3     |
| <i>Harpechloa falx</i> . . . . .           | 24        | 1.3     |
| <i>Anthospermum aethiopicum</i> . . . . .  | 29        | 1.0     |
| <i>Scabiosa albanensis</i> . . . . .       | 29        | 1.0     |
| <i>Hypoxis rooperi</i> . . . . .           | 29        | 1.0     |
| <i>Panicum ecklonii</i> . . . . .          | 18        | 1.0     |
| <i>Streptocarpus meyeri</i> . . . . .      | 6         | 1.0     |

### SAVANNAH (AREAS C AND E)

(Plate 2)

The savannah vegetation consists of two very distinct strata, a ground layer which is usually less than 0.5 metres high and to a large extent closed, and an open tree layer of very uniform height.

These two areas of vegetation, and especially the eastern area (E), which is known to have been cleared and ploughed at least forty years ago, still show evidence of having been disturbed.

The ground cover is to a large extent similar to that of the upper slopes but lacks several of the typically macchia species (e.g. *Restio triticeus*). In addition grasses are more abundant. The species of dicotyledons in the ground layer include a large proportion of species characteristic of disturbed land in this region (e.g. *Selago corymbosa* and *Chrysocoma tenuifolia*).

The figures for bare ground (see table 16) show that there is fifty percent more exposed soil and rock in the macchia-grassveld than in the savannah vegetation.



PLATE 2.

View from the road across the centre of the western savannah area (C). The trees in the foreground are almost entirely *Acacia karoo*. The far slope includes area H and the rather open area between areas H and G. The patch of *Euphorbia triangularis* shown in plate 3 is barely discernible to the left.

However, observation suggests that, biologically, the difference may not be as great as the figures suggest, because the ground layer vegetation of the savannah is lower growing.

In the tree layer *Acacia karoo* appears to be dominant (see plate 2)—the high figure for *Rhus undulata* in area C (see table 4) resulted from a chance, single quadrat. The species are similar to those in the tree or large bush layer in the thickets, particularly area D, and show similar average measurements (see table 16). However, comparisons of total ground cover and of trees per square metre show the difference between these vegetation types clearly.

As twenty quadrats were used, ten in each area, the analysis of the ground cover is probably fairly reliable (see tables 2 and 3). In the open tree layer too few plants were encountered to give any significance to the data on the individual species in tables 4 and 5. However, taking all the tree species together the general picture is likely to be reasonably true.

This vegetation coincides with Acocks' "Eastern Province Thornveld". Martin and Noel place it in "Acacia Grassland" although they do not indicate this type in the immediate vicinity of the reserve on their map.

TABLE 2  
GROUND COVER OF AREA C

|                                    | Frequency | % cover |
|------------------------------------|-----------|---------|
| Exposed ground . . . . .           | 100       | 24·3    |
| Selago corymbosa . . . . .         | 90        | 18·6    |
| Themeda triandra . . . . .         | 50        | 7·6     |
| Helichrysum anomalum . . . . .     | 70        | 6·7     |
| Heteropogon contortus . . . . .    | 40        | 2·9     |
| Tephrosia capensis . . . . .       | 60        | 2·3     |
| Tristachya hispida . . . . .       | 60        | 2·3     |
| Scutia indica . . . . .            | 20        | 2·3     |
| Eragrostis curvula . . . . .       | 60        | 2·0     |
| Chrysocoma tenuifolia . . . . .    | 40        | 1·9     |
| Anthospermum aethiopicum . . . . . | 30        | 1·9     |
| Haplocarpha lyrata . . . . .       | 20        | 1·8     |
| Schismus inermis . . . . .         | 10        | 1·8     |
| Canthium ciliatum . . . . .        | 10        | 1·8     |
| Cynodon dactylon . . . . .         | 10        | 1·8     |
| Bobartia indica . . . . .          | 30        | 1·2     |
| Elyonurus argenteus . . . . .      | 30        | 1·2     |
| Ficinia tristachya . . . . .       | 30        | 1·2     |

TABLE 3  
GROUND COVER OF AREA E

|                                     | Frequency | % cover |
|-------------------------------------|-----------|---------|
| Exposed ground . . . . .            | 100       | 21·4    |
| Acacia karoo . . . . .              | 70        | 20·0    |
| Xeromphis rudis . . . . .           | 60        | 9·2     |
| Schismus inermis . . . . .          | 50        | 8·4     |
| Chrysocoma tenuifolia . . . . .     | 50        | 7·5     |
| Centella coriacea . . . . .         | 50        | 6·7     |
| Sporobolus capensis . . . . .       | 70        | 5·8     |
| Selago corymbosa . . . . .          | 60        | 5·2     |
| Cynodon dactylon . . . . .          | 30        | 2·9     |
| Eragrostis curvula . . . . .        | 60        | 2·4     |
| Helichrysum anomalum . . . . .      | 30        | 2·4     |
| Scutia indica . . . . .             | 10        | 1·8     |
| Verbena venosa . . . . .            | 10        | 1·8     |
| Elytropappus rhinocerotis . . . . . | 10        | 1·8     |
| Aloe ferox . . . . .                | 10        | 1·8     |
| Rhus undulata . . . . .             | 40        | 1·7     |
| Aristida congesta . . . . .         | 30        | 1·2     |
| Eragrostis plana . . . . .          | 20        | 1·2     |

TABLE 4  
WOODY PLANTS OF AREA C

|                                              | Stems per<br>square metre | Frequency | %<br>of stems |
|----------------------------------------------|---------------------------|-----------|---------------|
| <i>Rhus undulata</i> . . . . .               | 0.04                      | 10.0      | 37.5          |
| <i>Acacia karoo</i> . . . . .                | 0.02                      | 30.0      | 18.8          |
| <i>Xeromphis rudis</i> . . . . .             | 0.01                      | 20.0      | 12.5          |
| <i>Scutia indica</i> . . . . .               | 0.01                      | 20.0      | 12.5          |
| <i>Rhus macowanii</i> . . . . .              | 0.01                      | 10.0      | 6.3           |
| <i>Grewia occidentalis</i> . . . . .         | 0.01                      | 10.0      | 6.3           |
| <i>Chrysanthemoides monilifera</i> . . . . . | 0.01                      | 10.0      | 6.3           |

TABLE 5  
WOODY PLANTS OF AREA E

|                                  | Stems per<br>square metre | Frequency | %<br>of stems |
|----------------------------------|---------------------------|-----------|---------------|
| <i>Acacia karoo</i> . . . . .    | 0.09                      | 60.0      | 71.4          |
| <i>Xeromphis rudis</i> . . . . . | 0.02                      | 10.0      | 14.3          |
| <i>Rhus undulata</i> . . . . .   | 0.01                      | 20.0      | 9.5           |
| <i>Scutia indica</i> . . . . .   | 0.01                      | 10.0      | 4.8           |

## FOREST AND THICKET (AREAS B, D, F, G AND H)

(Plates 1—3)

A range of communities has been included within this category, from those clearly dominated by trees (called forest here), especially in area B (see plate 1), to low dense thicket. Despite the small number of quadrats (five), representing the western area marked B on the map, on which the analysis of that area is based (see tables 6 and 11), field observation suggests it to be fairly typical. Among the tallest trees are *Apodytes dimidiata*, *Olea capensis*, *Cussonia spicata* and *Calodendrum capense*, all of which reach six metres or more. Low-growing thicket-forming species, especially *Scutia indica*, are frequent. In area B, however, these rarely form an entangled thicket and then usually only along the lower margins of the forest patches. In the smaller forest patch to the east, similarly situated in a depression within the macchia-grassveld, *Loxostylis alata* is particularly abundant, on the margin, and *Curtisia dentata* to the interior.

A second section in which relatively large trees occur is along the river towards the western entrance. *Vepris undulata*, *Harpephyllum caffrum* and *Ekebergia capensis* are frequently at least six metres high and in a number of cases considerably more. A single specimen of *Podocarpus falcatus*, in area G, is about



25 metres high. In the same area there is true forest with a canopy at about seven metres but individuals, e.g. *Schotia latifolia*, *Harpephyllum caffrum* and *Rhus chirindensis*, reach twice this height or more. One individual of *Schotia latifolia* in which the branches were to some extent supported by neighbouring trees, was estimated to have a crown of about 35 metres diameter. Again, low-growing species rarely form an entangled undergrowth in this forest area.

Twenty-eight quadrats were distributed over areas D, F, G and H. Although the analysis of individual areas, especially G and H, which were limited to four and five quadrats respectively, is based on inadequate samples, by taking the areas together a fairly realistic picture is obtained. The pronounced dominance of *Xeromphis rudis* immediately links these four areas (see tables 12–15). This relationship is borne out not only by the similarity in apparent structure but also by the very frequent occurrence of other species which tend to appear in all four areas, e.g. *Scutia indica*, *Phyllanthus verrucosus* and *Rhus undulata*. Unlike the forest area, with which the thickets merge, the vegetation overall tends to be low (two or three metres) and rather entangled (see table 16).

The ground cover in area D (see table 7), and to a lesser extent area F (see



PLATE 3.

The upper reaches of the Howison's Poort Reservoir, showing part of area H. In the foreground are various Cyperaceae. On the far side there are patches of *Phragmites australis* and *Typha latifolia*. The pale trees to the right are *Salix mucronata*, with *Euphorbia triangularis* behind.

table 8), shows very slight affinities with that of the savannah, e.g. *Schismus inermis* (see tables 2 and 3). Area B has a ground flora of species largely confined to that area (see table 6). The most obvious difference between the thicket vegetation on the southern slopes (G and H) and the northern slope (F) is in the ground cover. While the table gives 65·9% exposed ground for area F and 82·5 and 87·5% for slopes G and H (see tables 8—10), observation suggests that the differences are likely to be even greater. This difference is no doubt largely a result of the drier conditions on the southern slopes. It is interesting that no such marked difference is reflected in the figures for the woody plants (see tables 13—15).

The unlabelled area shown on the map between areas G and H appears to represent a disturbed form of the vegetation on either side of it. While the species are similar to those in the adjacent areas, the vegetation is very much more open.

Of the larger species, *Plumbago auriculata* is eaten but there is generally not much evidence of browsing. *Schismus inermis*, *Panicum* spp. and *Justicia bowiei* are among the most important grazing species.

The forest types include many species in common with Acocks' "Ngongoni Veld" but *Aristida junciformis* (the 'Ngongoni) is rare or absent. Martin and Noel's "Warm Temperate Forest" subformation of their "Temperate Rainforest and Scrub" has several aspects in common with this vegetation. The thicket vegetation probably belongs to the "southern variation of the Valley Bushveld" of Acocks. It differs from most of the Valley Bushveld in the relative scarcity of large succulents, although several such species do occur. In Martin and Noel's system, the thickets would belong to the "Warm Temperate Forest Scrub" subdivision of their "Temperate Rainforest and Scrub".

TABLE 6  
GROUND COVER OF AREA B

|                                                | Frequency | % cover |
|------------------------------------------------|-----------|---------|
| Exposed ground . . . . .                       | 100       | 77·5    |
| <i>Plectranthus verticillatus</i> . . . . .    | 60        | 2·6     |
| <i>Cyperus albostratus</i> . . . . .           | 40        | 2·0     |
| <i>Plectranthus madagascariensis</i> . . . . . | 40        | 1·1     |
| <i>Asplenium splendens</i> . . . . .           | 20        | 1·0     |
| <i>Scutia indica</i> . . . . .                 | 20        | 1·0     |

TABLE 7  
GROUND COVER OF AREA D

|                                 | Frequency | % cover |
|---------------------------------|-----------|---------|
| Exposed ground . . . . .        | 100       | 51.7    |
| Schismus inermis . . . . .      | 40        | 6.6     |
| Chrysocoma tenuifolia . . . . . | 60        | 4.0     |
| Selago corymbosa . . . . .      | 60        | 2.3     |
| Centella coriacea . . . . .     | 20        | 2.3     |
| Acacia karoo . . . . .          | 50        | 1.8     |
| Ctenomeria cordata . . . . .    | 10        | 1.8     |
| Grass indet. . . . .            | 10        | 1.8     |
| Teucrium capense . . . . .      | 40        | 1.7     |
| Themeda triandra . . . . .      | 30        | 1.7     |
| Cynodon dactylon . . . . .      | 30        | 1.2     |
| Cyanotis speciosa . . . . .     | 20        | 1.1     |

TABLE 8  
GROUND COVER OF AREA F

|                                                        | Frequency | % cover |
|--------------------------------------------------------|-----------|---------|
| Exposed ground . . . . .                               | 100       | 65.9    |
| Themeda triandra . . . . .                             | 22        | 4.8     |
| Schismus inermis . . . . .                             | 22        | 2.5     |
| Helichrysum rosum . . . . .                            | 44        | 2.4     |
| Xeromphis rudis . . . . .                              | 33        | 1.3     |
| Eragrostis curvula . . . . .                           | 22        | 1.2     |
| Additional particularly frequent species in this area: |           |         |
| Oxalis punctata . . . . .                              | 55        | 0.8     |
| Selago corymbosa . . . . .                             | 44        | 0.8     |
| Panicum deustum . . . . .                              | 44        | 0.8     |

TABLE 9  
GROUND COVER OF AREA G

|                                                        | Frequency | % cover |
|--------------------------------------------------------|-----------|---------|
| Exposed ground . . . . .                               | 100       | *87.5   |
| Xeromphis rudis . . . . .                              | 25        | 1.4     |
| Euclea undulata . . . . .                              | 25        | 1.4     |
| Stipa dregeana . . . . .                               | 25        | 1.4     |
| Additional particularly frequent species in this area: |           |         |
| Hypoestes verticillaris . . . . .                      | 50        | 0.3     |
| Crassula spathulata . . . . .                          | 50        | 0.3     |

\*This figure is probably much too low (see text, p. 377)

TABLE 10  
GROUND COVER OF AREA H

|                                          | Frequency | % cover |
|------------------------------------------|-----------|---------|
| Exposed ground . . . . .                 | 100       | 82.5    |
| <i>Sansevieria thyrsoflora</i> . . . . . | 80        | 2.4     |
| <i>Panicum deustum</i> . . . . .         | 80        | 1.4     |
| <i>Hypoestes verticillaris</i> . . . . . | 60        | 1.3     |
| <i>Aloe ferox</i> . . . . .              | 20        | 1.1     |
| <i>Panicum maximum</i> . . . . .         | 20        | 1.1     |
| <i>Diospyros dichrophylla</i> . . . . .  | 20        | 1.1     |
| <i>Xeromphis rudis</i> . . . . .         | 20        | 1.1     |
| <i>Euclea undulata</i> . . . . .         | 20        | 1.1     |
| <i>Plumbago auriculata</i> . . . . .     | 20        | 1.1     |

TABLE 11  
WOODY PLANTS OF AREA B

|                                         | Stems per square metre | Frequency | % of stems |
|-----------------------------------------|------------------------|-----------|------------|
| <i>Olea capensis</i> . . . . .          | 0.16                   | 40        | 19.7       |
| <i>Maytenus heterophylla</i> . . . . .  | 0.14                   | 80        | 16.7       |
| <i>Scutia indica</i> . . . . .          | 0.10                   | 100       | 12.1       |
| <i>Pavetta lanceolata</i> . . . . .     | 0.06                   | 20        | 7.6        |
| <i>Rhoicissus digitata</i> . . . . .    | 0.04                   | 20        | 4.5        |
| <i>Clausena inaequalis</i> . . . . .    | 0.04                   | 20        | 4.5        |
| <i>Xeromphis rudis</i> . . . . .        | 0.04                   | 20        | 4.5        |
| <i>Apodytes dimidiata</i> . . . . .     | 0.03                   | 20        | 3.0        |
| <i>Rhus chirindensis</i> . . . . .      | 0.03                   | 20        | 3.0        |
| <i>Harpephyllum capensis</i> . . . . .  | 0.03                   | 20        | 3.0        |
| <i>Scolopia mundii</i> . . . . .        | 0.03                   | 20        | 3.0        |
| <i>Diospyros dichrophylla</i> . . . . . | 0.03                   | 20        | 3.0        |
| <i>Canthium ventosum</i> . . . . .      | 0.03                   | 20        | 3.0        |
| <i>Acacia karo</i> . . . . .            | 0.03                   | 20        | 3.0        |

TABLE 12  
WOODY PLANTS OF AREA D

|                                         | Stems per square metre | Frequency | % of stems |
|-----------------------------------------|------------------------|-----------|------------|
| <i>Xeromphis rudis</i> . . . . .        | 0.18                   | 60        | 28.8       |
| <i>Phyllanthus verrucosus</i> . . . . . | 0.13                   | 20        | 20.6       |
| <i>Acacia karo</i> . . . . .            | 0.06                   | 60        | 10.3       |
| <i>Rhus undulata</i> . . . . .          | 0.06                   | 40        | 10.3       |
| <i>Canthium ventosum</i> . . . . .      | 0.06                   | 10        | 10.3       |
| <i>Scutia indica</i> . . . . .          | 0.04                   | 10        | 7.2        |
| <i>Lycium</i> sp. . . . .               | 0.02                   | 10        | 3.1        |
| <i>Maytenus heterophylla</i> . . . . .  | 0.02                   | 10        | 3.1        |
| <i>Diospyros dichrophylla</i> . . . . . | 0.01                   | 10        | 2.1        |

TABLE 13  
WOODY PLANTS OF AREA F

|                                         | Stems per<br>square metre | Frequency | %<br>of stems |
|-----------------------------------------|---------------------------|-----------|---------------|
| <i>Xeromphis rudis</i> . . . . .        | 0.98                      | 77.7      | 60.0          |
| <i>Hippobromus pauciflora</i> . . . . . | 0.15                      | 33.3      | 9.4           |
| <i>Rhus undulata</i> . . . . .          | 0.09                      | 55.5      | 5.5           |
| <i>Rhus incisa</i> . . . . .            | 0.08                      | 11.1      | 4.7           |
| <i>Acacia karoo</i> . . . . .           | 0.05                      | 55.5      | 3.0           |
| <i>Grewia occidentalis</i> . . . . .    | 0.05                      | 44.4      | 3.0           |
| <i>Aloe ferox</i> . . . . .             | 0.04                      | 44.4      | 2.6           |

TABLE 14  
WOODY PLANTS OF AREA G

|                                        | Stems per<br>square metre | Frequency | %<br>of stems |
|----------------------------------------|---------------------------|-----------|---------------|
| <i>Xeromphis rudis</i> . . . . .       | 0.44                      | 50        | 33.7          |
| <i>Euclea undulata</i> . . . . .       | 0.25                      | 25        | 19.3          |
| <i>Scutia indica</i> . . . . .         | 0.19                      | 50        | 14.5          |
| <i>Asparagus africanus</i> . . . . .   | 0.11                      | 50        | 7.2           |
| <i>Maytenus heterophylla</i> . . . . . | 0.08                      | 25        | 6.0           |
| <i>Trimeria trinervis</i> . . . . .    | 0.06                      | 25        | 4.8           |
| <i>Aloe ferox</i> . . . . .            | 0.03                      | 25        | 2.4           |
| <i>Rhus undulata</i> . . . . .         | 0.03                      | 25        | 2.4           |
| <i>Grewia occidentalis</i> . . . . .   | 0.03                      | 25        | 2.4           |

TABLE 15  
WOODY PLANTS OF AREA H

|                                         | Stems per<br>square metre | Frequency | %<br>of stems |
|-----------------------------------------|---------------------------|-----------|---------------|
| <i>Xeromphis rudis</i> . . . . .        | 0.69                      | 40        | 26.6          |
| <i>Phyllanthus verrucosus</i> . . . . . | 0.48                      | 40        | 18.4          |
| <i>Capparis sepiaria</i> . . . . .      | 0.26                      | 40        | 10.1          |
| <i>Olea africana</i> . . . . .          | 0.18                      | 20        | 6.8           |
| <i>Euclea undulata</i> . . . . .        | 0.16                      | 40        | 6.3           |
| <i>Euphorbia triangularis</i> . . . . . | 0.14                      | 20        | 5.3           |
| <i>Rhoicissus digitata</i> . . . . .    | 0.13                      | 100       | 4.8           |
| <i>Plumbago auriculata</i> . . . . .    | 0.10                      | 40        | 3.9           |
| <i>Sarcostemma viminalis</i> . . . . .  | 0.06                      | 40        | 2.4           |
| <i>Diospyros dichrophylla</i> . . . . . | 0.06                      | 20        | 2.4           |
| <i>Schotia latifolia</i> . . . . .      | 0.06                      | 40        | 2.4           |



TABLE 16  
SUMMARY OF DATA FOR ALL AREAS

| Area | WOODY PLANTS           |               |                           |                       | Exposed ground % |
|------|------------------------|---------------|---------------------------|-----------------------|------------------|
|      | Stems per square metre | Height metres | Stem diameter centimetres | Crown diameter metres |                  |
| A    | —                      | —             | —                         | —                     | 35.5             |
| C    | 0.1                    | 2.5           | 3.9                       | 1.6                   | 24.3             |
| E    | 0.1                    | 1.8           | 3.5                       | 2.2                   | 21.4             |
| B    | 0.8                    | 4.2           | 3.8                       | 1.9                   | 77.5             |
| D    | 0.6                    | 2.1           | 3.5                       | 0.6                   | 51.7             |
| F    | 1.6                    | 2.0           | 2.7                       | 1.1                   | 65.9             |
| G    | 1.3                    | 2.2           | 3.9                       | 2.0                   | 87.5             |
| H    | 2.6                    | 1.8           | 3.3                       | 1.6                   | 82.5             |

## RIVERINE VEGETATION

The vegetation of the banks of the river and reservoir has not been thoroughly examined. *Salix mucronata* is common and a conspicuous tree along the banks of the river. Monocotyledons play a major role in the herbaceous vegetation. *Stenotaphrum secundatum* and *Cynodon dactylon* are very general species, forming much of the ground cover. *Prionium serratum* occurs in the upper portions of the river within the reservoir and *Cyperus textilis* is locally frequent along the margin of the reservoir.

## ALIEN SPECIES

Several alien species are well established. Of these, *Opuntia megacantha*, in the thicket areas, is probably spreading fastest. Other potentially important species are *Acacia mearnsii* along the river and *A. ?longifolia* in area D, and *Hakea acicularis* also along the river. *Agave americana* is locally frequent but not apparently spreading to any extent.

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## LIST OF SPECIES RECORDED IN THE THOMAS BAINES RESERVE 1969

(This list does not claim any degree of completeness. It only records specimens collected or noted during the period of the work described).

|                                                  | AREAS |   |   |   |   |   |   |   | Nr W. Gate |
|--------------------------------------------------|-------|---|---|---|---|---|---|---|------------|
|                                                  | A     | B | C | D | E | F | G | H |            |
| PTERIDOPHYTES                                    |       |   |   |   |   |   |   |   |            |
| Mohria caffrorum (L.) Desv. . . . .              | ×     |   |   | × | × |   |   |   |            |
| Pteridium aquilinum (L.) Kuhn . . . . .          | ×     |   |   |   |   | × |   |   |            |
| Cheilanthes hirta Sw. . . . .                    | ×     | × |   |   |   |   |   |   |            |
| Pellaea calomelanos (Sw.) Link . . . . .         | ×     |   |   |   |   |   |   |   |            |
| P. viridis (Forsk.) Prantl . . . . .             | ×     |   | × | × | × | × |   | × | ×          |
| Blechnum australe L. . . . .                     |       | × |   |   |   |   |   |   |            |
| Asplenium rutaefolium (Berg.) Kunze . . . . .    |       | × |   |   |   |   |   |   |            |
| A. splendens Kunze . . . . .                     |       | × |   |   |   |   |   |   |            |
| Ceterach cordatum (Thunb.) Desv. . . . .         |       |   |   | × |   | × |   | × |            |
| GYMNOSPERMS                                      |       |   |   |   |   |   |   |   |            |
| Podocarpus falcatus Mirb. . . . .                |       |   |   |   |   |   | × |   |            |
| MONOCOTYLEDONS                                   |       |   |   |   |   |   |   |   |            |
| <i>Typhaceae</i>                                 |       |   |   |   |   |   |   |   |            |
| Typha latifolia L. . . . .                       |       |   |   |   |   |   |   | × |            |
| <i>Gramineae</i>                                 |       |   |   |   |   |   |   |   |            |
| Miscanthidium capense (Nees) Stapf . . . . .     |       |   | × |   |   |   | × |   |            |
| Heteropogon contortus Beauv. . . . .             | ×     |   | × |   |   |   |   |   |            |
| Elyonurus argenteus Nees . . . . .               |       |   | × |   |   |   |   |   |            |
| Cymbopogon marginatus (Steud.) Stapf . . . . .   |       |   | × |   |   |   |   |   |            |
| Hyparrhenia hirta (L.) Stapf . . . . .           |       |   | × |   |   |   |   |   |            |
| Themeda triandra Forsk. . . . .                  | ×     |   | × | × |   | × |   |   |            |
| Panicum aquinerve Nees . . . . .                 | ×     | × |   |   |   | × | × |   |            |
| P. ?chusqueoides Hack. . . . .                   |       | × |   |   |   |   |   |   |            |
| P. deustum Thunb. . . . .                        |       | × |   |   |   | × | × | × |            |
| P. ecklonii Nees . . . . .                       | ×     |   |   | × |   |   |   |   |            |
| P. maximum Jacq. . . . .                         |       | × | × | × | × | × |   | × |            |
| Allotriopsis semialata (R. Br.) Hitch. . . . .   | ×     |   | × |   |   |   |   |   |            |
| Brachiaria serrata (Spreng.) Stapf . . . . .     | ×     |   | × | × | × | × |   |   |            |
| Rhynchelytrum setifolium (Stapf) Chiov. . . . .  |       |   |   |   | × |   |   |   |            |
| Digitaria diagonalis (Nees) Stapf . . . . .      | ×     |   |   |   |   |   |   |   |            |
| D. eriantha Steud. . . . .                       | ×     |   |   |   |   |   |   |   |            |
| Oplismenus hirtellus (L.) Beauv. . . . .         |       | × |   |   |   |   |   |   |            |
| Stenotaphrum secundatum (Walt.) Kuntze . . . . . |       |   |   |   |   | × | × | × |            |
| Ehrharta erecta Lam. . . . .                     |       |   |   | × |   |   |   |   |            |
| Aristida congesta Roem. & Schult. . . . .        |       |   |   | × | × |   |   |   |            |
| Stipa dregeana Steud. . . . .                    |       |   |   |   |   | × | × |   |            |

|                                                    | AREAS |   |   |   |   |   |   |   | Nr W. Gate |
|----------------------------------------------------|-------|---|---|---|---|---|---|---|------------|
|                                                    | A     | B | C | D | E | F | G | H |            |
| <i>Sporobolus capensis</i> (Willd.) Kunth          |       |   | × | × | × | × |   |   |            |
| <i>Helictotrichon turgidulum</i> (Stapf) Schweick. |       |   |   |   | × |   |   |   |            |
| <i>Tristachya hispidula</i> (L.f.) K. Schum.       | ×     |   | × |   |   |   |   |   |            |
| <i>Danthonia disticha</i> Nees                     | ×     |   |   |   |   |   |   |   |            |
| <i>Pentaschistis angustifolia</i> (Nees) Stapf     | ×     |   | × | × |   |   |   |   |            |
| <i>Cynodon dactylon</i> (L.) Pers.                 |       |   | × | × | × | × |   |   |            |
| <i>Harpechloa falx</i> (L.f.) Kuntze               | ×     |   |   |   |   |   |   |   |            |
| <i>Phragmites australis</i> (Cav.) Trin. ex Steud. |       |   |   |   |   | × |   | × |            |
| <i>Eragrostis capensis</i> (Thunb.) Trin.          |       |   |   |   | × |   |   |   |            |
| <i>E. curvula</i> (Schrud.) Nees                   |       |   | × | × | × | × | × |   |            |
| <i>E. obtusa</i> Munro                             |       |   |   | × | × | × |   |   |            |
| <i>E. plana</i> Nees                               |       |   |   |   | × |   |   |   |            |
| <i>E. racemosa</i> (Thunb.) Steud.                 |       |   |   |   |   | × |   |   |            |
| <i>Schismus inermis</i> (Stapf) Hubb.              | ×     |   | × | × | × | × |   |   |            |
| <i>Cyperaceae</i>                                  |       |   |   |   |   |   |   |   |            |
| <i>Cyperus albostratus</i> Schrad.                 |       |   |   | × |   |   |   |   |            |
| <i>Cyperus textilis</i> Thunb.                     |       |   |   |   |   | × |   | × |            |
| <i>Pycurus polystachyus</i> Beauv.                 |       |   |   |   |   | × | × |   |            |
| <i>Mariscus capensis</i> Schrad.                   |       |   | × |   | × |   |   |   |            |
| <i>Kyllinga melanospora</i> Nees                   | ×     |   | × | × | × |   |   |   |            |
| <i>Ficinia filiformis</i> (Lam.) Schrad.           |       |   | × |   |   |   |   |   |            |
| <i>F. tristachya</i> (Rottb.) Nees                 |       |   | × |   | × |   |   |   |            |
| <i>Ficinia</i> spp.                                | ×     |   |   |   |   |   |   |   |            |
| <i>Fimbristylis hispidula</i> (Vahl) Kunth         | ×     |   |   |   |   |   |   |   |            |
| <i>Bulbostylis humilis</i> Kunth                   |       |   | × |   | × |   |   |   |            |
| <i>Tetraria cuspidata</i> C.B.C1.                  | ×     |   |   |   |   |   |   |   |            |
| <i>Schoenoxiphium sparteum</i> (Wahl.) Kuek.       |       |   | × |   | × | × | × |   |            |
| <i>Carex zuluensis</i> C.B.C1.                     |       | × |   |   |   |   |   |   |            |
| <i>Restionaceae</i>                                |       |   |   |   |   |   |   |   |            |
| <i>Restio triticeus</i> Rottb.                     | ×     |   |   |   |   |   |   |   |            |
| <i>Leptocarpus paniculatus</i> Mast.               |       |   |   |   |   |   | × |   |            |
| <i>Commelinaceae</i>                               |       |   |   |   |   |   |   |   |            |
| <i>Commelina africana</i> L.                       |       |   |   |   |   |   | × |   |            |
| <i>C. krebsiana</i> Kunth                          |       |   | × |   | × |   |   |   |            |
| <i>Commelina</i> sp.                               | ×     | × |   | × |   | × | × | × |            |
| <i>Cyanotis speciosa</i> (L.f.) Hassk.             | ×     |   |   | × |   | × | × | × |            |
| <i>Juncaceae</i>                                   |       |   |   |   |   |   |   |   |            |
| <i>Prionium serratum</i> (L.f.) Drege              |       |   |   |   |   | × |   |   |            |
| <i>Liliaceae</i>                                   |       |   |   |   |   |   |   |   |            |
| <i>Bulbine natalensis</i> Bak.                     |       |   |   |   |   |   |   |   | ×          |
| <i>Eriospermum</i> spp.                            | ×     |   |   | × | × | × | × |   |            |
| <i>Kniphofia uvaria</i> (L.) Hook. f.              | ×     |   |   |   |   |   |   |   |            |
| <i>Aloe ferox</i> Mill.                            |       | × |   | × | × | × | × | × |            |
| <i>A. myriacantha</i> (Haw.) Roem. & Schult.       | ×     |   |   |   |   |   |   |   |            |

|                                                     | AREAS |   |   |   |   |   |   |   | Nr W. Gate |
|-----------------------------------------------------|-------|---|---|---|---|---|---|---|------------|
|                                                     | A     | B | C | D | E | F | G | H |            |
| <i>A. pluridens</i> Haw. . . . .                    | ×     |   |   |   |   |   |   |   |            |
| <i>Tulbaghia alliacea</i> L.f. . . . .              | ×     |   |   |   |   |   |   |   |            |
| <i>Drimia anomala</i> Benth. . . . .                |       |   |   |   |   |   |   | × |            |
| <i>Scilla lanceaeifolia</i> (Jacq.) Bak. . . . .    | ×     |   |   |   |   | × |   |   |            |
| <i>S. saturata</i> Bak. . . . .                     | ×     |   |   |   |   |   |   |   |            |
| <i>Ornithogalum</i> spp. . . . .                    | ×     |   | × |   |   |   |   |   |            |
| <i>Asparagus africanus</i> Lam. . . . .             |       |   |   |   |   | × | × | × |            |
| <i>A. asparagoides</i> (L.) Wight . . . . .         |       |   |   |   |   |   |   | × |            |
| <i>A. crassiciadus</i> Jess. . . . .                |       |   |   |   |   |   |   | × |            |
| <i>A. macowanii</i> Bak. . . . .                    |       | × |   |   |   |   |   |   |            |
| <i>A. mucronatus</i> Jess. . . . .                  |       |   |   |   |   |   |   | × |            |
| <i>A. racemosus</i> Willd. . . . .                  |       |   |   |   |   | × | × |   |            |
| <i>A. setaceus</i> (Kunth) Jess. . . . .            |       |   |   | × |   | × | × | × |            |
| <i>A. striatus</i> (L.f.) Thunb. . . . .            |       |   |   |   |   | × | × | × |            |
| <i>A. suaveolens</i> Burch. . . . .                 | ×     |   | × |   |   | × |   | × |            |
| <i>A. subulatus</i> (Thunb.) L.f. . . . .           |       |   |   |   |   | × | × |   |            |
| <i>Dracaena hookeriana</i> K. Koch . . . . .        |       | × |   |   |   | × | × |   |            |
| <i>Sansevieria thyrsiflora</i> Thunb. . . . .       |       | × |   |   |   | × | × | × |            |
| <i>Agave americana</i> L. . . . .                   |       |   |   |   | × |   |   |   |            |
| <i>Amaryllidaceae</i>                               |       |   |   |   |   |   |   |   |            |
| <i>Boophane disticha</i> Herb. . . . .              | ×     |   | × |   |   |   |   |   |            |
| <i>Clivia nobilis</i> Lindl. . . . .                |       |   |   |   |   |   | × |   |            |
| <i>Hypoxis argentea</i> Harv. . . . .               | ×     |   |   |   |   | × |   |   |            |
| <i>H. rooperi</i> Moore . . . . .                   | ×     |   |   |   |   | × |   |   |            |
| <i>H. ?zeyheri</i> Bak. . . . .                     |       |   | × |   |   |   |   |   |            |
| <i>Hypoxis</i> sp. . . . .                          | ×     |   |   |   |   |   |   |   |            |
| <i>Iridaceae</i>                                    |       |   |   |   |   |   |   |   |            |
| <i>Romulea autumnalis</i> L. Bol. . . . .           |       |   |   |   |   | × |   |   |            |
| <i>Dietes vegeta</i> (Mill.) N.E. Br. . . . .       |       |   |   | × |   | × |   | × |            |
| <i>Bobartia indica</i> L. . . . .                   | ×     |   | × |   |   |   |   |   |            |
| <i>Aristea anceps</i> Eckl. . . . .                 | ×     |   |   |   |   |   |   |   |            |
| <i>A. cognata</i> N.E. Br. . . . .                  |       |   |   | × | × |   |   |   |            |
| <i>A. pusilla</i> (Thunb.) Ker-Gawl. . . . .        | ×     |   |   |   |   |   |   |   |            |
| <i>Aristea</i> sp. . . . .                          |       |   |   |   |   |   | × |   |            |
| <i>Tritonia securigera</i> (Ait.) Ker-Gawl. . . . . |       |   |   | × | × | × | × | × |            |
| <i>Gladiolus maculatus</i> Sweet . . . . .          | ×     |   |   |   |   |   |   |   |            |
| <i>?Watsonia</i> sp. . . . .                        | ×     |   |   |   |   |   |   |   |            |
| <i>Orchidaceae</i>                                  |       |   |   |   |   |   |   |   |            |
| <i>Orchid</i> (?sp.) . . . . .                      | ×     |   |   |   |   | × |   |   |            |
| DICOTYLEDONS                                        |       |   |   |   |   |   |   |   |            |
| <i>Salicaceae</i>                                   |       |   |   |   |   |   |   |   |            |
| <i>Salix mucronata</i> Thunb. . . . .               |       |   |   |   |   | × | × | × |            |
| <i>Moraceae</i>                                     |       |   |   |   |   |   |   |   |            |
| <i>Ficus capensis</i> Thunb. . . . .                |       |   |   |   |   | × | × |   |            |
| <i>Proteaceae</i>                                   |       |   |   |   |   |   |   |   |            |
| <i>Protea tenax</i> R. Br. . . . .                  | ×     |   |   |   |   |   |   |   |            |
| <i>Leucadendron salignum</i> Berg. . . . .          | ×     |   |   |   |   |   |   |   |            |
| <i>Hakea acicularis</i> R. Br. . . . .              |       |   |   |   |   | × |   |   |            |





[illegible]

|                                                        | AREAS |   |   |                  |   |   |   |   | Nr W. Gate |
|--------------------------------------------------------|-------|---|---|------------------|---|---|---|---|------------|
|                                                        | A     | B | C | D                | E | F | G | H |            |
| <i>Euphorbiaceae</i>                                   |       |   |   |                  |   |   |   |   |            |
| <i>Phyllanthus verrucosus</i> Thunb.                   | ×     |   |   | ×                |   |   | × | × |            |
| <i>Croton rivularis</i> E. Mey. ex Muell.-Arg.         |       |   |   |                  |   |   |   | × |            |
| <i>Ctenomeria cordata</i> Harv.                        |       |   |   | ×                |   |   | × |   |            |
| <i>Dalechampia capensis</i> Spreng. f.                 |       |   |   |                  |   |   |   | × |            |
| <i>Ricinus communis</i> L.                             |       |   |   |                  |   |   | × |   |            |
| <i>Clutia heterophylla</i> Thunb.                      | ×     |   |   |                  |   |   |   |   |            |
| <i>C. laxa</i> Eckl.                                   |       |   | × | ×                | × | × |   |   | ×          |
| ? <i>Clutia</i> sp.                                    |       |   | × |                  |   |   |   |   |            |
| <i>Euphorbia bupleurifolia</i> Jacq.                   |       |   |   |                  |   |   |   | × | ×          |
| <i>E. fimbriata</i> Scop.                              |       |   |   |                  |   |   |   | × |            |
| <i>E. kraussiana</i> Bernh.                            |       | × |   |                  |   |   |   |   |            |
| <i>E. polygona</i> Haw.                                |       |   |   |                  |   |   |   |   | ×          |
| <i>E. sclerophylla</i> Boiss.                          | ×     |   |   |                  |   |   |   |   |            |
| <i>E. silenifolia</i> (Haw.) Sweet                     | ×     |   |   |                  |   |   |   |   |            |
| <i>E. triangularis</i> Desf.                           |       |   |   | (×) <sup>1</sup> |   |   |   | × |            |
| <i>Anacardiaceae</i>                                   |       |   |   |                  |   |   |   |   |            |
| <i>Harpephyllum caffrum</i> Bernh.                     |       | × |   |                  |   | × | × | × |            |
| <i>Loxostylis alata</i> Spreng.                        | ×     | × |   |                  |   |   |   |   |            |
| <i>Rhus chirindensis</i> Bak. f.                       |       | × |   |                  |   | × |   |   |            |
| <i>R. incisa</i> L.f.                                  |       |   |   |                  |   | × | × |   |            |
| <i>R. lucida</i> L.                                    |       |   |   |                  |   | × |   |   |            |
| <i>R. macowanii</i> Schonl.                            |       |   | × |                  | × | × |   |   |            |
| <i>R. refracta</i> Eckl. & Zeyh.                       |       |   |   |                  | × | × | × | × |            |
| <i>R. undulata</i> Jacq.                               | ×     | × | × | ×                | × | × | × | × | ×          |
| <i>Celastraceae</i>                                    |       |   |   |                  |   |   |   |   |            |
| <i>Maytenus heterophylla</i> (Eckl. & Zeyh.) N. Robson |       | × | × | ×                |   | × | × |   |            |
| <i>M. nemorosa</i> (Eckl. & Zeyh.) Loes.               |       |   |   |                  |   |   |   | × |            |
| <i>M. peduncularis</i> (Sond.) Loes.                   |       |   |   |                  |   |   |   | × |            |
| <i>Pterocelastrus tricuspidatus</i> (Lam.) Sond.       |       | × | × |                  |   |   |   |   | ×          |
| <i>Cassine tetragona</i> (Thunb.) Loes.                |       | × | × | (×) <sup>1</sup> |   | × |   |   |            |
| <i>Icacinaceae</i>                                     |       |   |   |                  |   |   |   |   |            |
| <i>Apodytes dimidiata</i> E. Mey. ex Arn.              |       | × |   | (×) <sup>1</sup> |   |   |   |   |            |
| <i>Sapindaceae</i>                                     |       |   |   |                  |   |   |   |   |            |
| <i>Allophylus decipiens</i> (Sond.) Radlk.             |       |   |   |                  |   | × |   | × |            |
| <i>Pappea capensis</i> Eckl. & Zeyh.                   |       |   |   |                  |   |   | × | × |            |
| <i>Hippobromus pauciflora</i> (L.) Radlk.              |       | × |   |                  |   | × | × |   | ×          |
| <i>Rhamnaceae</i>                                      |       |   |   |                  |   |   |   |   |            |
| <i>Scutia indica</i> Brongn.                           | ×     | × | × | ×                | × | × | × | × | ×          |
| <i>Phyllica paniculata</i> Willd.                      |       |   |   |                  |   |   | × |   |            |
| <i>Vitaceae</i>                                        |       |   |   |                  |   |   |   |   |            |
| <i>Rhoicissus digitata</i> (L.f.) Gilg & Brandt        |       | × |   | ×                |   | × | × | × |            |
| <i>R. tomentosa</i> (Lam.) Wild & Drummond             |       | × |   |                  |   |   | × |   |            |
| <i>R. tridentata</i> (L.f.) Wild & Drummond            |       | × |   | ×                |   |   |   |   |            |

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| <i>Tiliaceae</i>                                         |       |   |   |   |   |   |   |   |            |
| <i>Grewia occidentalis</i> L. . . . .                    |       |   | × | × | × | × | × | × | ×          |
| <i>Malvaceae</i>                                         |       |   |   |   |   |   |   |   |            |
| <i>Abutilon sonneratianum</i> Cav. . . . .               |       |   |   |   |   | × | × | × |            |
| <i>Sida dregei</i> Burtt Davy . . . . .                  |       |   |   | × |   | × | × | × |            |
| <i>S. triloba</i> Cav. . . . .                           |       |   |   | × | × | × | × | × |            |
| <i>Hibiscus</i> sp. cf. <i>leiospermus</i> Harv. . . . . |       |   |   |   | × | × |   |   |            |
| <i>H. pusillus</i> Thunb. . . . .                        |       |   |   |   |   | × |   |   |            |
| <i>Hibiscus</i> sp. . . . .                              |       |   | × |   |   |   |   |   |            |
| <i>Sterculiaceae</i>                                     |       |   |   |   |   |   |   |   |            |
| <i>Melhania didyma</i> Eckl. & Zeyh. . . . .             |       |   |   | × |   |   |   |   |            |
| <i>Hermannia candicans</i> Ait. . . . .                  |       |   |   | × | × | × |   |   |            |
| <i>H. flammea</i> Jacq. . . . .                          | ×     |   |   | × |   | × |   |   |            |
| <i>Ochnaceae</i>                                         |       |   |   |   |   |   |   |   |            |
| <i>Ochna arborea</i> Burch. . . . .                      |       |   |   |   |   | × |   |   |            |
| <i>Guttiferae</i>                                        |       |   |   |   |   |   |   |   |            |
| <i>Hypericumalandii</i> Choisy. . . . .                  | ×     |   |   |   |   |   |   |   |            |
| <i>Flacourtiaceae</i>                                    |       |   |   |   |   |   |   |   |            |
| <i>Scolopia mundii</i> Warb. . . . .                     |       |   |   |   |   |   | × | × |            |
| <i>S. zeyheri</i> Szyszyl. . . . .                       |       |   |   | × |   | × | × | × | ×          |
| <i>Trimeria trinervis</i> Harv. . . . .                  |       | × |   |   |   | × | × |   |            |
| <i>Dovyalis rhamnoides</i> (Burch. ex DC.) Harv. . . . . |       | × |   |   |   | × |   |   |            |
| <i>Cactaceae</i>                                         |       |   |   |   |   |   |   |   |            |
| <i>Opuntia megacantha</i> Salm Dyck . . . . .            |       |   |   | × | × |   | × | × |            |
| <i>Thymelaeaceae</i>                                     |       |   |   |   |   |   |   |   |            |
| <i>Gnidia anthyllodes</i> (L.f.) Gilg . . . . .          | ×     |   |   |   |   |   |   |   |            |
| <i>G. nodiflora</i> Meissn. . . . .                      |       |   | × |   |   |   |   |   |            |
| <i>G. racemosa</i> Thunb. . . . .                        |       |   |   | × |   | × | × |   |            |
| <i>G. stypheloides</i> Meissn. . . . .                   | ×     |   |   |   |   |   |   |   |            |
| <i>Struthiola argentea</i> Lehm. . . . .                 | ×     |   |   |   |   |   |   |   |            |
| <i>Passerina ?vulgaris</i> Thoday . . . . .              |       |   | × |   |   | × |   |   |            |
| <i>Myrtaceae</i>                                         |       |   |   |   |   |   |   |   |            |
| <i>Eugenia zeyheri</i> Harv. . . . .                     |       | × |   |   |   |   |   |   |            |
| <i>Araliaceae</i>                                        |       |   |   |   |   |   |   |   |            |
| <i>Cussonia spicata</i> Thunb. . . . .                   | ×     | × | × |   |   | × | × |   |            |
| <i>Umbelliferae</i>                                      |       |   |   |   |   |   |   |   |            |
| <i>Centella coriacea</i> Nannf. . . . .                  |       |   | × | × | × | × |   |   |            |
| <i>Alepidea capensis</i> (Berg.) R. A. Dyer . . . . .    | ×     |   |   |   |   |   |   |   |            |
| <i>Cornaceae</i>                                         |       |   |   |   |   |   |   |   |            |
| <i>Curtisia dentata</i> (Burm.f.) C.A. Sm. . . . .       |       | × |   |   |   |   |   |   |            |
| <i>Ericaceae</i>                                         |       |   |   |   |   |   |   |   |            |
| <i>Erica caffra</i> L. . . . .                           |       |   |   |   |   | × | × |   |            |

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| <i>E. cerinthoides</i> L. . . . .                           | ×     |   |   |   |   |   |   |   |            |
| <i>E. glumaeiflora</i> Klotzsch . . . . .                   | ×     |   |   |   |   |   |   |   |            |
| <i>E. sp. cf. leucopelta</i> Tausch . . . . .               |       |   | × |   | × |   |   |   |            |
| <i>E. nemorosa</i> Klotzsch ex Benth. . . . .               |       |   |   |   |   | × | × | × |            |
| <i>E. sp.</i> . . . . .                                     |       |   |   |   |   | × |   |   |            |
| <i>Myrsinaceae</i>                                          |       |   |   |   |   |   |   |   |            |
| <i>Rapanea melanophloeos</i> (L.) Mez.                      |       | × |   |   |   |   |   |   |            |
| <i>Plumbaginaceae</i>                                       |       |   |   |   |   |   |   |   |            |
| <i>Plumbago auriculata</i> Lam. . . . .                     |       |   |   | × | × | × | × | × |            |
| <i>Sapotaceae</i>                                           |       |   |   |   |   |   |   |   |            |
| <i>Sideroxylon inerme</i> L. . . . .                        |       | × |   |   |   | × |   |   |            |
| <i>Ebenaceae</i>                                            |       |   |   |   |   |   |   |   |            |
| <i>Diospyros dichrophylla</i> (Gand.)<br>De Wint . . . . .  | ×     | × | × | × |   | × | × | × | ×          |
| <i>D. whyteana</i> (Hiern) F. White . . . . .               |       |   |   | × |   |   |   |   |            |
| <i>Euclea schimperi</i> (A.DC.) Dandy . . . . .             |       |   |   |   |   | × |   |   |            |
| <i>E. undulata</i> Thunb. . . . .                           |       |   | × |   |   | × | × | × | ×          |
| <i>Oleaceae</i>                                             |       |   |   |   |   |   |   |   |            |
| <i>Olea africana</i> Mill. . . . .                          |       | × |   |   |   | × | × | × |            |
| <i>O. capensis</i> L. . . . .                               |       | × |   |   |   | × |   |   |            |
| <i>Linociera foveolata</i> (E. Mey.)<br>Knobl. . . . .      |       | × |   |   |   |   |   |   |            |
| <i>Jasminum angulare</i> Vahl . . . . .                     |       |   |   |   |   |   |   | × |            |
| <i>Salvadoraceae</i>                                        |       |   |   |   |   |   |   |   |            |
| <i>Azima tetracantha</i> Lam. . . . .                       |       |   |   | × |   | × |   | × |            |
| <i>Loganiaceae</i>                                          |       |   |   |   |   |   |   |   |            |
| <i>Buddleia saligna</i> Willd. . . . .                      |       |   |   | × |   | × | × |   |            |
| <i>Gentianaceae</i>                                         |       |   |   |   |   |   |   |   |            |
| <i>Chironia tetragona</i> L.f. . . . .                      | ×     |   |   |   |   |   |   |   |            |
| <i>Apocynaceae</i>                                          |       |   |   |   |   |   |   |   |            |
| <i>Carissa bispinosa</i> (L.) Desf. . . . .                 | ×     | × |   | × |   | × | × | × |            |
| <i>Asclepiadaceae</i>                                       |       |   |   |   |   |   |   |   |            |
| <i>Asclepias physocarpa</i> (E. Mey.)<br>Schltr. . . . .    |       |   |   |   |   | × |   |   |            |
| <i>Cynanchum ellipticum</i> (Harv.) R. A.<br>Dyer . . . . . |       |   |   |   |   |   | × |   |            |
| <i>Sarcostemma viminalis</i> (L.) R. Br. . . . .            |       |   |   | × |   | × | × | × |            |
| <i>Secamone alpini</i> Schult. . . . .                      |       |   |   |   |   | × | × |   | ×          |
| <i>S. frutescens</i> (E. Mey.) Decne. . . . .               |       |   |   |   |   | × | × |   |            |
| <i>Ceropegia ?carnosa</i> E. Mey. . . . .                   |       |   |   |   |   |   | × | × |            |
| <i>Stapeliad</i> (?sp.) . . . . .                           |       |   |   |   |   |   |   | × |            |
| <i>Marsdenia floribunda</i> (E. Mey.)<br>N.E. Br. . . . .   |       |   |   |   |   |   | × |   |            |
| <i>Boraginaceae</i>                                         |       |   |   |   |   |   |   |   |            |
| <i>Ehretia rigida</i> (Thunb.) Druce . . . . .              |       |   |   | × |   |   |   | × |            |

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| <i>Verbenaceae</i>                                             |       |   |   |   |   |   |   |   |            |
| <i>Verbena venosa</i> Gill. . . . .                            |       |   |   | × | × |   |   |   |            |
| <i>Lantana rugosa</i> Thunb. . . . .                           |       |   |   |   | × | × |   |   |            |
| <i>Lippia javanica</i> (Burm.f.) Spreng. .                     |       |   | × | × |   |   |   |   |            |
| <i>Labiatae</i>                                                |       |   |   |   |   |   |   |   |            |
| <i>Teucrium capense</i> Thunb. . . . .                         |       |   | × | × | × | × |   |   |            |
| <i>Leonotis leonurus</i> (L.) Ait. . . . .                     |       |   |   |   |   | × |   |   | ×          |
| <i>Salvia repens</i> Burch. ex Benth. . .                      |       |   |   |   |   | × |   | × |            |
| <i>Plectranthus madagascariensis</i><br>(Pers.) Benth. . . . . |       | × |   | × |   |   |   | × |            |
| <i>P. verticillatus</i> (L.f.) Druce . . . .                   |       | × |   |   |   |   |   |   |            |
| <i>Plectranthus</i> sp. . . . .                                |       |   |   |   |   |   |   | × |            |
| <i>Solanaceae</i>                                              |       |   |   |   |   |   |   |   |            |
| <i>Lycium</i> sp. . . . .                                      |       |   |   | × |   |   |   | × |            |
| <i>Datura stramonium</i> L. . . . .                            |       |   |   | × |   | × | × |   |            |
| <i>Scrophulariaceae</i>                                        |       |   |   |   |   |   |   |   |            |
| <i>Diascia capsularis</i> Benth. . . . .                       | ×     |   |   |   |   |   |   |   |            |
| <i>Halleria lucida</i> L. . . . .                              |       | × |   |   |   |   |   |   |            |
| <i>Sutera campanulata</i> (Benth.)<br>Kuntze . . . . .         | ×     |   | × | × |   | × |   |   |            |
| <i>S. pinnatifida</i> (Benth.) Kuntze . . .                    |       |   |   | × | × |   |   |   |            |
| <i>Gesneriaceae</i>                                            |       |   |   |   |   |   |   |   |            |
| <i>Streptocarpus meyeri</i> Burtt . . . .                      | ×     |   |   |   |   |   |   |   |            |
| <i>Selaginaceae</i>                                            |       |   |   |   |   |   |   |   |            |
| <i>Selago corymbosa</i> L. . . . .                             | ×     |   | × | × | × | × | × |   | ×          |
| <i>Walafrida geniculata</i> (L.f.) Rolfe .                     |       |   |   |   |   |   |   | × |            |
| <i>Acanthaceae</i>                                             |       |   |   |   |   |   |   |   |            |
| <i>Thunbergia atriplicifolia</i> Lindl. . .                    |       |   |   | × |   | × |   |   |            |
| <i>T. capensis</i> Retz. . . . .                               | ×     |   | × |   |   |   |   |   |            |
| <i>Chaetacanthus setiger</i> (Pers.) Lindl.                    | ×     |   | × |   | × |   | × |   |            |
| <i>Hypoestes aristata</i> (Vahl) R. Br. . .                    |       |   |   |   |   | × | × |   |            |
| <i>H. verticillaris</i> R. Br. . . . .                         |       | × |   | × |   | × | × | × |            |
| <i>Justicia bowiei</i> C.B.Cl. . . . .                         |       |   |   |   |   |   | × | × |            |
| <i>Rubiaceae</i>                                               |       |   |   |   |   |   |   |   |            |
| <i>Kohautia amatymbica</i> Eckl. &<br>Zeyh. . . . .            | ×     |   |   |   |   |   |   |   |            |
| <i>Burchellia bubalina</i> (L.f.) Sims . . .                   | ×     |   | × | × |   | × |   |   | ×          |
| <i>Xeromphus rudis</i> (E. Mey. ex Harv.)<br>Codd . . . . .    | ×     | × | × | × | × | × | × | × | ×          |
| <i>Canthium ciliatum</i> (Sond.) Kuntze .                      |       | × | × |   |   | × | × |   |            |
| <i>C. obovatum</i> Klotzsch . . . . .                          | ×     |   |   |   |   |   |   |   |            |
| <i>C. ventosum</i> (L.) S. Moore . . . . .                     |       | × |   |   |   | × |   | × | ×          |
| <i>Pavetta lanceolata</i> Eckl. . . . .                        |       | × |   |   |   |   |   |   |            |
| <i>P. revoluta</i> Hochst. . . . .                             |       |   |   | × |   |   |   |   |            |
| <i>Psychotria capensis</i> (Eckl.) Vátke .                     | ×     | × |   | × |   | × | × |   |            |
| <i>Galopina circaeoides</i> Thunb. . . . .                     |       |   | × |   |   |   |   |   |            |
| <i>Anthospermum aethiopicum</i> L. . . .                       | ×     |   | × |   | × |   |   |   |            |
| <i>A. herbaceum</i> L.f. . . . .                               |       | × |   |   |   |   |   |   |            |



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| <i>Dipsacaceae</i>                                      |       |   |   |   |   |   |   |   |            |
| <i>Scabiosa albanensis</i> R. A. Dyer . . .             | ×     |   |   |   |   |   |   |   |            |
| <i>Cucurbitaceae</i>                                    |       |   |   |   |   |   |   |   |            |
| <i>Coccinia quinqueloba</i> (Thunb.) Cogn. . . . .      |       | × |   |   |   |   |   |   |            |
| <i>Campanulaceae</i>                                    |       |   |   |   |   |   |   |   |            |
| <i>Wahlenbergia capillacea</i> (Thunb.) A.DC. . . . .   | ×     |   |   |   |   |   |   |   |            |
| <i>W. stellarioides</i> Cham. . . . .                   |       |   | × |   |   |   |   |   |            |
| <i>Cyphia volubilis</i> Willd. . . . .                  | ×     |   |   |   |   |   |   |   |            |
| <i>Lobelia anceps</i> Thunb. . . . .                    |       |   |   |   |   |   |   |   | ×          |
| <i>L. tomentosa</i> L. . . . .                          | ×     |   |   |   |   |   | × |   |            |
| <i>Monopsis scabra</i> Urb. . . . .                     |       |   |   |   |   | × |   |   |            |
| <i>Compositae</i>                                       |       |   |   |   |   |   |   |   |            |
| <i>Vernonia capensis</i> (Houtt.) Druce . . . . .       |       |   | × |   |   |   |   |   |            |
| <i>Corymbium africanum</i> L. . . . .                   | ×     |   |   |   |   |   |   |   |            |
| <i>Aster filifolius</i> Vent. . . . .                   |       |   |   |   |   |   |   | × |            |
| <i>A. hispidus</i> Bak. . . . .                         | ×     |   |   |   |   |   |   |   |            |
| <i>A. muricatus</i> (Thunb.) Nees . . . . .             |       |   |   |   |   | × |   |   |            |
| <i>A. ?sp.</i> . . . . .                                |       |   | × | × |   |   |   |   |            |
| <i>Erigeron canadense</i> L. . . . .                    |       |   |   |   |   | × |   |   |            |
| <i>Microglossa mespilifolia</i> (Less.) Robins. . . . . |       |   |   |   |   |   |   |   | ×          |
| <i>Chrysocoma tenuifolia</i> Berg. . . . .              |       |   | × | × | × | × |   |   | ×          |
| <i>Brachylaena elliptica</i> (Thunb.) Less. . . . .     |       |   |   |   |   | × |   |   | ×          |
| <i>Tarchonanthus camphoratus</i> L. . . . .             | ×     |   |   |   |   |   |   |   |            |
| <i>Helichrysum anomalum</i> Less. . . . .               | ×     |   | × | × | × | × |   |   |            |
| <i>H. ?appendiculatum</i> (L.f.) Less. . . . .          | ×     |   |   |   |   |   |   |   |            |
| <i>H. felinum</i> (Thunb.) Less. . . . .                | ×     |   |   |   |   |   |   |   |            |
| <i>H. nudifolium</i> (L.) Less. . . . .                 | ×     |   | × |   |   | × |   |   |            |
| <i>H. pedunculare</i> (L.) Less. . . . .                | ×     |   |   | × | × | × |   |   |            |
| <i>H. rosum</i> (Berg.) Less. . . . .                   | ×     |   |   | × |   | × | × |   | ×          |
| <i>H. squamosum</i> Thunb. . . . .                      | ×     |   |   |   |   |   |   |   |            |
| <i>H. subglomeratum</i> Less. . . . .                   | ×     |   |   |   |   |   |   |   |            |
| <i>Leontonyx squarrosa</i> (L.) DC. . . . .             | ×     |   |   |   |   |   |   |   |            |
| <i>Disparago ericoides</i> Gaertn. . . . .              | ×     |   |   |   |   | × |   |   |            |
| <i>Elytropappus rhinocerotis</i> (L.f.) Less. . . . .   | ×     |   | × |   | × | × |   |   |            |
| <i>Metalasia gnaphalodes</i> (Thunb.) Druce . . . . .   | ×     |   |   |   |   |   |   |   |            |
| <i>M. muricata</i> (L.) R. Br. . . . .                  | ×     |   | × |   | × |   |   |   |            |
| <i>Relhania pungens</i> L'Herit. . . . .                | ×     |   |   |   |   | × |   |   |            |
| <i>Cineraria saxifraga</i> DC. . . . .                  |       |   |   |   |   |   |   |   | ×          |
| <i>Senecio angulatus</i> L.f. . . . .                   |       |   |   |   |   |   | × | × |            |
| <i>S. brachypodus</i> DC. . . . .                       |       | × |   |   |   |   |   |   |            |
| <i>S. burchellii</i> DC. . . . .                        |       |   |   |   | × |   |   |   |            |
| <i>S. concolor</i> DC. . . . .                          | ×     |   | × |   | × |   | × |   |            |
| <i>S. deltoideus</i> Less. . . . .                      |       |   |   |   |   | × |   |   |            |
| <i>S. gramineus</i> Harv. . . . .                       | ×     |   |   |   |   |   |   |   |            |
| <i>S. sp. cf. inaequidens</i> DC. . . . .               |       |   | × |   |   |   |   |   |            |
| <i>S. longifolius</i> L. . . . .                        | ×     |   |   | × |   | × |   | × | ×          |
| <i>S. othonnaeflorus</i> DC. . . . .                    | ×     |   |   |   |   |   |   |   |            |
| <i>S. ?othonnaeflorus</i> DC. . . . .                   | ×     |   |   |   |   |   |   |   |            |

|                                                             | AREAS |   |   |   |   |   |   |   | Nr W. Gate |
|-------------------------------------------------------------|-------|---|---|---|---|---|---|---|------------|
|                                                             | A     | B | C | D | E | F | G | H |            |
| <i>S. sp. cf. oxydontus</i> DC. . . . .                     |       |   |   |   |   |   | × | × |            |
| <i>S. paniculatus</i> Berg. . . . .                         |       |   |   |   |   |   |   |   | ×          |
| <i>S. pterophorus</i> DC. . . . .                           | ×     |   | × |   |   |   |   |   |            |
| <i>S. puberulus</i> DC. . . . .                             |       |   |   |   |   | × |   |   |            |
| <i>S. radicans</i> (L.f.) Sch. Bip. . . . .                 |       |   |   |   |   |   |   | × |            |
| <i>S. retrorsus</i> DC. . . . .                             |       |   |   | × | × | × | × |   |            |
| <i>S. tropaeolifolius</i> MacOwan . . . . .                 | ×     |   |   |   |   |   |   |   |            |
| <i>Chrysanthemoides monilifera</i> (L.) Norl. . . . .       |       | × | × |   | × | × |   |   |            |
| <i>Venidium decurrens</i> Less. . . . .                     |       |   |   | × |   |   |   |   |            |
| <i>Haplocarpha lyrata</i> Harv. . . . .                     |       |   | × |   |   |   |   |   |            |
| <i>Gazania linearis</i> (Thunb.) Druce . . . . .            | ×     |   | × |   |   |   |   |   |            |
| <i>Berkheya carduoides</i> (Less.) Hutch. ex Fourc. . . . . | ×     |   |   |   |   |   |   |   |            |
| <i>B. decurrens</i> (Thunb.) Willd. . . . .                 | ×     |   |   |   |   |   |   |   |            |
| <i>Oldenburgia arbuscula</i> DC. . . . .                    | ×     |   |   |   |   |   |   |   |            |
| <i>Gerbera piloselloides</i> (L.) Cass. . . . .             | ×     |   | × | × | × | × |   |   |            |
| <i>Sonchus dregeanus</i> DC. . . . .                        | ×     |   |   |   | × |   |   |   |            |

(Species given as follows—(×)<sup>1</sup>—were recorded from the boundary of areas D and E.)